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A phantom study for the optimization of image quality and radiation dose for common radiographic examinations in digital radiography (Article)

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Abstract

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Introduction: Phantom studies facilitate the implementation of radiation dose surveillance as a function of radiographic technical parameters for minimizing patient radiation dose. The evidence of such investigations can then be used to evaluate technical parameters used in the radiographic procedures to reduce radiation dose without compromising the image quality. Material and Methods: This experimental study was carried out using an anthropomorphic phantom and the Leeds test object. Computed radiographic system was utilized and the images were printed for objective evaluation. Dose-area-product (DAP) readings were obtained using a DAP meter for the technical parameters employed for the radiographic procedures. Results: The use of 0.2 mm additional copper filtration resulted in the lowest radiation doses for all four radiographic procedures (i.e. posteroanterior chest, anteroposterior abdomen and lumbar sacral spine projections). The highest tube potential appropriate to the body part being imaged, patient size, image receptor response and required information resulted in the minimum radiation dose to the patient without compromising the image quality. The focus to film distance utilized for the radiographic procedure must be in accordance with the focus to grid distance specified by the manufacturer when using the bucky to eliminate grid "cut-off." Conclusion: The optimization of image quality and radiation dose can be accomplished by using a phantom and selecting the imaging parameters that yield an acceptable image quality with the lowest entrance surface dose while considering the adjustment for patient size. © 2018 Mashhad University of Medical Sciences.

SciVal Topic Prominence

Topic: Radiographic Image Enhancement | Radiography | radiography CR

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Digital radiography | Radiation dosage | Radiation protection | Radiologic phantom

Indexed keywords

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